

Periodic Bathymetry and Single Beam Surveys Report, 2012
Response to EPA Comments

No.	Section/ Worksheet No.	Comment	Response
1	<i>AECOM Report, Section 1.0, Overview</i>	<p>In the statement “The 2012 single beam survey was conducted of nine areas with water depths less than 6 feet outside the limits of the multi-beam surveys (Figure 2 and Figure 3).”</p> <p>a. Report(s) should remain consistent with definition of water depth vs datum elevation. Elevation is preferred (instead of depth) because it is not dependent upon a fluctuating tide.</p>	<p>The depth was less than -6 feet National Geodetic Vertical Datum of 1929 (NGVD29). Edits were made to the AECOM report to provide clarification.</p>
2	<i>GBA Multi-beam Report, Section 3.0 Bathymetry Survey, Multibeam Survey</i>	<p>“90-deg was primarily used”...When was the 90-deg limitation on beam angle lifted and were data from beam angles greater than 45-deg to the side used in the final dataset at any point?</p>	<p>Only data within 45 degrees of nadir were used for deliverables. An edit was made to the report to provide clarification.</p>
3	<i>GBA Multi-beam Report, Section 3.0 Bathymetry Survey, Multibeam Survey, Single Beam Equipment</i>	<p>The single beam transducer is a dual frequency sonar: Has GBA ever evaluated the low frequency data for comparison to the high frequency sonar? Does it indicate anything about the subsurface?</p>	<p>No, GBA has not formally evaluated the low frequency data as it was outside of the scope of work for the survey. No edits were made to the report.</p>
4	<i>GBA Multi-beam Report, Section 4.0 Data Processing</i>	<p>100% overlap is not the same as 100% bottom coverage (100% overlap is actually 200% bottom coverage). Please clarify what was targeted and why 100% bottom coverage was not possible even if it required additional survey time.</p>	<p>Per the Quality Assurance Project Plan (AECOM, 2010), the survey target was full (100%) bottom coverage. One hundred percent bottom coverage was achieved at depths greater than six feet. One hundred percent bottom coverage was not possible for survey areas in shallow water depths and due to the requirement to restrict sounding data to within 45 degrees of nadir. Where possible (at greater depths), 100% overlap was attempted. Edits were made to the report to specify that the survey target was 100% bottom coverage.</p>
5	<i>GBA Multi-beam Report, Section 4.0 Data Processing</i>	<p>What were the statistical filters applied?</p>	<p>Statistical filters applied were limited to a deviation of 2 sigma above and below the bin average depth in overlapping passes, accounting for sloping bottoms. The HYPACK contains an algorithm to account for areas where there were sloped bottoms. An edit was made to the report to describe the filters.</p>

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6	<i>GBA Multi-beam Report, Section 5.0 QA/QC</i>	What wasn't a bar check completed each day for the multi-beam sonar like the single-beam sonar?	A bar check of multibeam sounders is not a common daily practice as it is with single beam echosounders; however, bar checks are conducted periodically. Bar checks are completed directly below the transducer and don't account for the range of the multibeam. Sound velocity checks, which were conducted multiple times each day during the survey, are more appropriate for multibeam sounders since the sound profile affects both the horizontal and vertical. A multibeam bar check was conducted in Baltimore, MD prior to mobilizing and again when the vessel was on site in New Jersey. In addition, a multibeam bar check was performed at the beginning of each survey and was witnessed in real-time by observers representing both AECOM (Bill Gerkin) and the EPA (Jason Magelan of SEA). No edits were made to the report.
7	<i>GBA Multi-beam Report, Section 5.0 QA/QC, Performance Tests</i>	Was the performance test <i>reference surface</i> the same for all performance tests? If so, on which day was the reference surface collected?	No, the reference surfaces were different between the pre-survey (August 30, 2012), mid-survey (September 11, 2012), and post-survey (September 17, 2012) patch and performance tests, but were collected in the same location in Upper Newark Bay. This practice has been conducted consistently since the 2008 Lower Passaic River survey. The report was edited to provide clarification.
8	<i>GBA Multi-beam Report, Section 5.0 QA/QC, Performance Tests</i>	Where were the performance test surfaces collected? Is this the same as all previous surveys? If not, why was the location changed?	The performance testing was conducted in the Upper Newark Bay in 2012 within the confluence of the Passaic and Hackensack Rivers and immediately north the railway bridge. This is same location that 2011 tests were performed. The 2007-2010 patch and performance tests were conducted in the Lower Newark Bay, but ongoing maintenance and new dredging work in the Lower Newark Bay affected the area. An edit was made to report to indicate performance tests were conducted in Upper Newark Bay.
9	<i>GBA Multi-beam Report, Attachment 1, Appendix 3</i>	What is the explanation for the spiking in the data at RM 2.0? Is the same signature seen in the multi-beam data from the same coordinates to verify the data?	The spiking data in the single beam line is related to metal debris located near a half sunken barge on the Kearny side of the river. The same signature was observed in the multibeam bathymetry surveys of this area to date. No edits were made to the report.

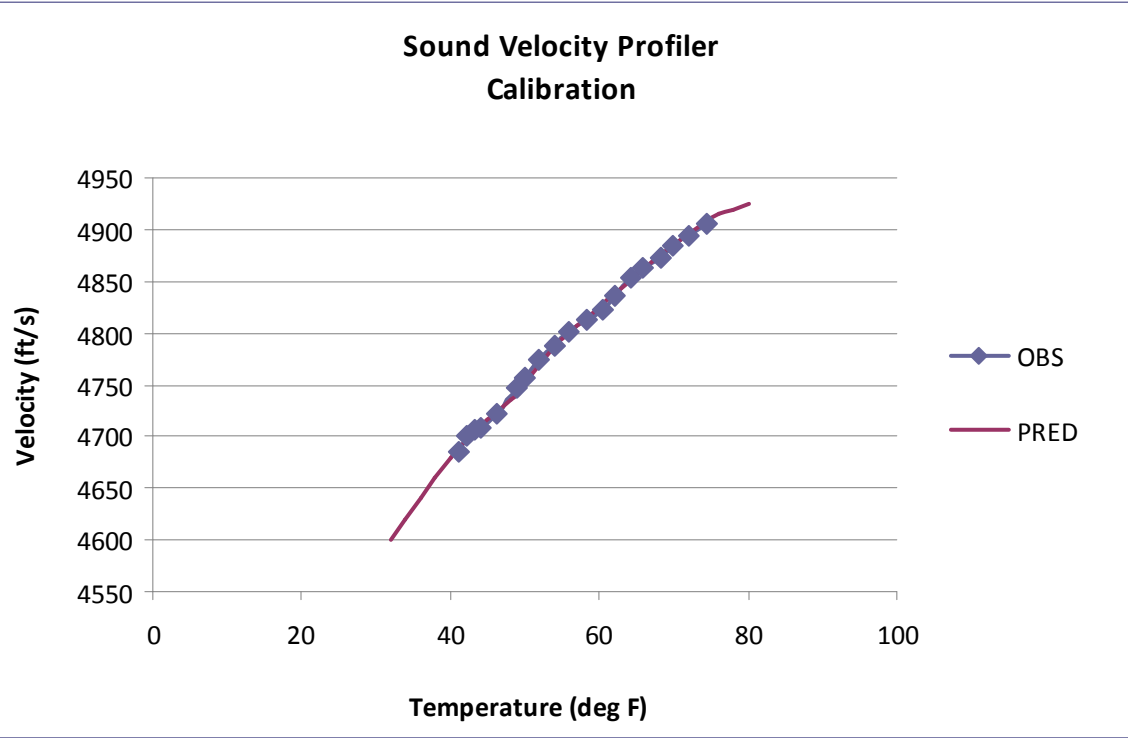
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10	<i>GBA Multi-beam Report, Attachment 1, Appendix 4</i>	On 9 Sept 2012, page 4 of 11, when “diff” is noted in the HDOP column, does that indicate the GPS was operating in differential mode (not RTK)? And, were those data ultimately kept or discarded? What was the criteria to keep/discard?	Data collection during the period noted was being performed in the small wedge of the Passaic River directly upstream of the Point-No-Point Rail Bridge and downstream of the NJ Turnpike Bridge. The close proximity of the two bridges hinders GPS reception and has hindered GPS reception during every survey to date. In order to survey in this area, the survey vessel was located in an area where an RTK fixed position could be established to lock in the current water level. Survey data collection began in an RTK fixed status and, when the GPS signal was lost due to bridge cover, the POSMV switched to internal navigation for the remainder of the short survey line. Surveys in this area were specifically isolated so that data collection below the Rail Bridge and above the Turnpike Bridge was not impacted. Data were retained. No data were discarded. No edits were made to the report.
11	<i>GBA Multi-beam Report</i>	Please provide the numerical results of the bar checks for single-beam and multi-beam (measured vs. known).	Single beam bar checks were conducted to ensure that check values matched the known values as listed on the daily log sheets. Multibeam bar checks obtained under direct observation of both AECOM and EPA observers were within 0.1 foot of the target bar depth of 10 ft. The data on the bar checks are included on the daily log sheets in Appendix 4 of the report. No edits were made to the report.
12	<i>GBA Single-beam Report, Section 3.0 Single Beam Survey, Survey Equipment</i>	Since two single-beam echosounders were utilized (CV 100 and the Mark II), were any inter-comparisons done between systems prior to surveying to evaluate performance?	Comparisons between the single beam echosounder on the single beam vessel and the multibeam vessel were performed during the course of the survey and showed good agreement, as did a comparison of the single beam vessel – single beam data to multibeam data overlap. Correlation between datasets was within 0.25 feet and within USACE specifications. No edits were made to the report.
13	<i>GBA Single-beam Report, Section 5.0 QA/QC, Sound Velocity Profiles</i>	<p>It appears that the same sound velocity profiler calibration plot is being shown for the Fall 2012 multi-beam survey, Fall 2012 single-beam survey, Fall 2011 multibeam survey and Summer 2011 (RM 10.9) survey.</p> <ol style="list-style-type: none"> Please clarify since the text indicates that the SV profiler was calibrated prior to each survey Was the same SV profiler used for the Fall 2012 single-beam and multi-beam surveys? <ol style="list-style-type: none"> If so, how was that possible if the two surveys were occurring simultaneously? If not, were both SV profilers calibrated prior to the surveys? 	<p>Upon review we found that the 2011 graphic was mistakenly used in the 2012 report. An updated graphic and the Factory Calibration of the SV Profiler dated May 29, 2012 are provided in Attachment 1. The graphic was also added to the report as Figure 1.</p> <p>The SV profiler was only used for the multibeam survey. The SV profiler was not used for the single beam survey. The single beam was calibrated using bar checks. No edits were made to the report.</p>

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14	<i>GBA Single-beam Report, Section 5.0 QA/QC, Final QA Verification</i>	Please quantify how the single-beam data compared to the multi-beam data in overlap areas?	Single beam data collected with an overlap to multibeam sounding data agreed within 0.25 feet, well within USACE standards. The report was edited to provide clarification.
15	<i>GBA Single-beam Report</i>	Please list the results of the latency tests for the single-beam vessel.	Each day selected survey lines were run in opposing directions to check for latency errors. Latency checks ranged from 0.0 to 0.1 seconds and were within the limits of the Hyack testing algorithms. In addition, the relative survey speeds on the single beam vessel (3-4 knots) mitigated any potential positional error related to latency. Latency test records were not maintained. No edits were made to the report.
16	<i>GBA Single-beam Report, Attachment 2, Appendix 2</i>	The handwritten notes contain the word 'Questionable' frequently. Please clarify what that pertained to: gps coverage?	"Questionable" was noted in the survey logs when a physical obstacle, such as overhanging tree limbs or structures resided along the shoreline and hindered GPS satellite reception. No edits were made to the report.
17	<i>GBA Single-beam Report, Attachment 2, Appendix 2</i>	What does Q/A mean in the notes?	Q/A indicates that a line was re-run for internal QA of repeatability. No edits were made to the report.
18	<i>GBA Single-beam Report, Attachment 2, Appendix 2</i>	Why were pole soundings used in the field notes?	GBA took an extra step in their internal QA/QC: GBA compared pole soundings to echosounder readings in shallow water to provide an additional level of confidence in their survey data. No edits were made to the report.
19	<i>GBA Single-beam Report, Attachment 2, Appendix 2</i>	The HDOP on the single-beam vessel (as high as 3-5) was frequently larger than that reported on the multi-beam vessel (typically less than 2). a. Was this due to poor sky visibility? b. Were these lines still used? If so, what was the criteria by which they were kept or omitted?	Working from a small skiff platform, the single beam survey had to rely on a stand-alone GPS receiver for positioning, as opposed the POSMV internal navigation system. The single beam survey required the skiff to navigate as close to shore as possible. This required the vessel to survey into or directly beneath the vegetation and the tree line which hindered GPS reception. These lines were all retained. No edits were made to the report.
20	<i>GBA Single-beam Report</i>	Please provide the numerical results of the bar checks for single-beam (measured vs. known).	Single beam bar checks were conducted to ensure that check values matched the known values as listed on the daily log sheets. i.e., 5 foot check = 5.0 feet on echosounder. These results are listed on the daily logs sheets in Appendix 4 of the report. No edits were made to the report.

ATTACHMENT 1 – SOUND VELOCITY PROFILER GRAPHIC AND THE FACTORY CALIBRATION



2012 Sound Velocity Profiler Calibration



Certificate of Calibration

Customer: Gahagan & Bryant Associates, Inc. (MD)
Asset Serial Number: 004194
Asset Product Type: Smart SV&P Instrument, 500m Housing
Calibration Type: Pressure
Calibration Range: 50 dBar
Calibration RMS Error: .0088
Calibration ID: 004194 999999 0DW503 290512 163014
Installed On:

Coefficient A:	-1.019002E+2	Coefficient G:	-1.526263E-7
Coefficient B:	-1.144717E-1	Coefficient H:	2.740948E-9
Coefficient C:	3.217819E-3	Coefficient I:	3.835053E-9
Coefficient D:	-5.139740E-5	Coefficient J:	-3.909474E-11
Coefficient E:	2.758467E-3	Coefficient K:	1.670908E-12
Coefficient F:	4.580344E-6	Coefficient L:	-3.610228E-14
		Coefficient M:	0.000000E+0

Calibration Date (dd/mm/yyyy): 29/5/2012

Certified By:

Robert Haydock

President, AML Oceanographic

AML Oceanographic certifies that the asset described above has been calibrated or recalibrated with equipment referenced to traceable standards. Please note that Xchange™ sensor-heads may be installed on assets other than the one listed above; this calibration certificate will still be valid when used on other such assets. If this instrument or sensor has been recalibrated, please be sure to update your records. Please also ensure that you update the instrument's coefficient values in any post-processing software that you use, if necessary. Older generation instruments may require configuration files, which are available for download at our Customer Centre at www.AMLoceanographic.com/support

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